

# A Self Driving Car using Machine Learning and IOT:

## A Review

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### ABSTRACT

In the fashionable era, the vehicles are centered to be automated to grant human driver relaxed driving. within numerous aspects are thought of that makes a vehicle machine-driven. Google, the most important network, has started working on self-driving cars since 2010 and is still developing new changes to grant an entire new level to the automated vehicles. During this work we've gotten centered on 2 applications of an automated automobile, one during which 2 vehicles have same destination, and one is aware of the route, wherever different don't. The following vehicle can follow the target (i.e. Front) vehicle mechanically. The other application is machine-driven driving throughout the heavy traffic jam, thence restful driver from endlessly pushing brakes, accelerator or clutch. the concept delineated during this paper has been taken from the Google automobile, defining the one side hereinafter thought is creating the destination dynamic. This can be done by a vehicle mechanically following the destination of another vehicle. Since taking intelligent choices within the within a difficulty for the machine-driven vehicle therefore this side has been also into consideration during this paper.

**Key Words**—Automated driving throughout rush hours, dynamic, destination, self-driving, Open Cv, A.I.

### I. Introduction

Automated vehicles square measure technological development in the field of cars. though the machine-driven vehicles square measure forecast of man however they're the foremost high-priced vehicles. In the paper considering the various options and also the price, on a tiny scale a 3 wheel conveyance Robotic epitome has been designed which will mechanically reach the destination of another vehicle to that it's alleged to follow. We have centered on 2 applications of AN Automated Vehicles here and designed a epitome vehicle for that. The one major issue is throughout significant significant a driver has to endlessly push brake, accelerator and clutch to move to destination slowly. we've got projected an answer to relax the driving force therein state of affairs by creating vehicle good enough to build choices mechanically and move by maintaining a specified distance from vehicles and obstacles around. The second issue is once 2 vehicles have the same destination however one among the drivers doesn't recognize its route. The driver will build his vehicle follow the front vehicle if they are known and share their location to succeed in identical destination. A three-wheel Mobile automaton is employed for analysis is given. The Mobile automaton consists of multiple sensors, that helps it to communicate with Google Maps API (Application Program Interface) and makes it confirm obstacles so as to follow the route and move swimmingly. The Mobile automaton connects directly to Google Maps API exploitation

GPRS Module, gets route and moves therein direction. whereas the supersonic sensors, which are used for epitome style, helps to avoid obstacles on run time. The traffic state of affairs in India ends up in style this project prototype, that aims at reposeful driver and making an automated vehicle whose destination is dynamic in contrast to Google car, whose destination is static and fixed. This analysis has been a requirement for Pakistan if enforced in real time. The remaining paper is organized because the Section II shows the connected work worn out worn out. Later we've got discussed our methodology to implement this idea and solve the problem in Section III. Then we've got shown performance analysis of our Mobile automaton in Section IV and finally, we've got concluded the paper in Section V.

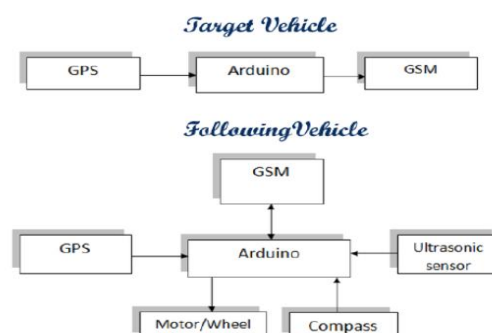
### II. Literature

After the event of the autopilot airplanes [1], self-driven sailboats and ships; the misleadingly modest dream that has seldom ventured on the far side the pages of science fiction since our grandparent's youth is that the self-driving automobile [2]. By the passage of your time, a lot of work has been allotted within the area to create cars self-driven [3], [4] however because of technological advancement within the roads and also the increasing population has made difficult for this dream to changing into true. In the pre-computer days of the Nineteen Thirties, the driverless cars were solely the science fiction things. however the event of the computing machine created doable to dream of self-driven vehicles outside the fiction. By the Nineteen Sixties the self-driven cars have been unreal to navigate on normal streets

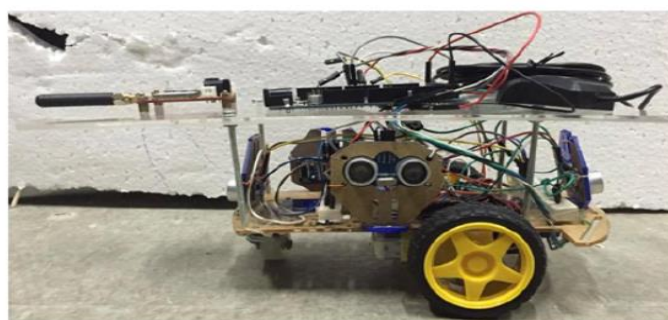
on their own. German pioneer Ernst Dickmanns, within the Nineteen Eighties, got a Mercedes van to drive many miles autonomously on highways, an amazing exploit particularly with the computing power of the time [2]. Within the mid-2000s, the Defense Advanced Research Agency (DARPA) sorted out the Grand Challenges wherever teams assembled to traumatize self-driving vehicles. In 2009, Google began the self-driving car venture, as well as colleagues United Nations agency had effectively devoted years to the innovation. By 2012 the Google automobile hits the road for testing. By the passing years, the automobile is developed and equipped with multiple sensors, radars, lasers, Global Positioning System (GPS), it uses heavily elaborated maps, and many different things to soundly drive and navigate itself with no human interaction. The automobile can't solely drive itself however it can be lay on its own, it will maintain freeways, Cameras are wont to find objects that square measure then processed by the pc at intervals the automobile [5]. In could 2014, Google presented a brand new construct for his or her driverless automobile that had neither a handwheel nor pedals and undraped a totally functioning prototype in December of that year that they planned to check in 2015 [6]. In summer 2015, Google launched and tested some different options wherever every prototype's speed is capped at a neighborhood-friendly 25mph, and through this part safety drivers aboard with a removable handwheel, accelerator pedal, and treadle that permit them to require over driving if required [7]. When several productive roads testing of Google car has created to believe some years roads are going to be safely occupied with self-driven cars. The authors in [8], [9], [10] have developed unmanned vehicle prototypes during which they need worked on the obstacle avoidance and path coming up with [11]. In this paper, we've designed 2 applications of an autonomous vehicle, which might facilitate the driving force to relax for the sure length of your time. This paper presents a construct in that the modified concept of Google automobile is concentrated, the Google automobile should reach the static destination automatically; in our image, we've created the destination dynamic. Here our destination is additionally a vehicle that is moving on a certain route. Our image can follow that vehicle. Another application that we've enforced here was to tackle heavy traffic congestion and permit the vehicle to maneuver automatically during that traffic congestion.

### III. Implementation Methodologies

Our example model shows some work on each the application that we've mentioned during this paper. Fig.1 shows the diagram of example Mobile mechanism (Vehicle).



**Fig 1: Block Diagram**



**Fig 2: Design of Self Driving Car**

Our main focus was on Following Vehicle, that detects and avoids obstacles, coordinate with Google Maps API, get route and follow the route. For one more application, it checks vehicles around and mechanically moves slowly behind the traffic till it gets out of traffic jam state of affairs. The function of the Target vehicle is simply to produce the coordinates to Following Vehicle, that also are not static because the Target vehicle is moving towards its destination. Fig.2 shows one application within which it follows another vehicle. Fig.3 shows another application within which vehicle automatically follow the front vehicle and maintains specified distance from vehicles around. The vehicle mechanically moves and hence relaxes the driving force. The Fig. a pair of and three shows the hardware implementation.

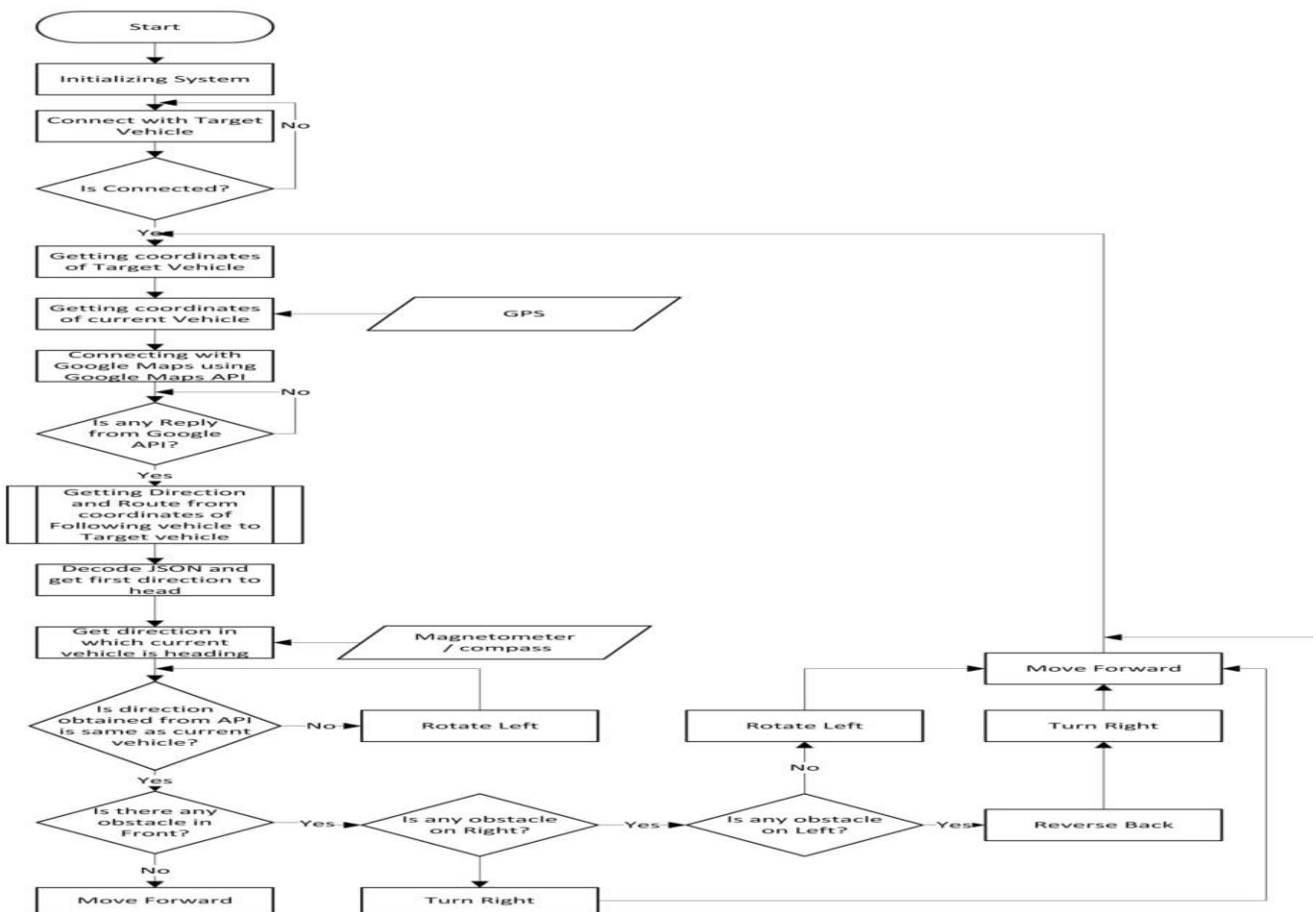
This whole project involves the 2 the 2 the 2 the Target Vehicle and second as Following vehicle. The Target vehicle fetches its existing location coordinates through GPS and sends to Arduino then these coordinates within the kind of the message has been sent to Following vehicle once every certain time of interval.



**Fig 3: Scenario How We Tested It.**

The Following vehicle whenever receives a message through GSM, the message is shipped to Arduino. Arduino then decodes the message and fetches the coordinates of Target vehicle. Since Arduino already has its own coordinates (at Following Vehicle side). Through GPRS arduino then connects to the Google Maps and compares the prevailing location coordinates of Target vehicle received through the message with existing location coordinates of the subsequent vehicle; so tries to find the littlest doable route to succeed in the Target vehicle. Arduino in spite of everything the process gets the direction from Google API. This direction is then compared with Robot's current direction and once rotating vehicle in this direction, the vehicle starts moving forward. so vehicle can continue attractive the current location received from the Target vehicle once every certain time span and can continue move in this direction and this method continues till the vehicle reaches the destination vehicle's location.

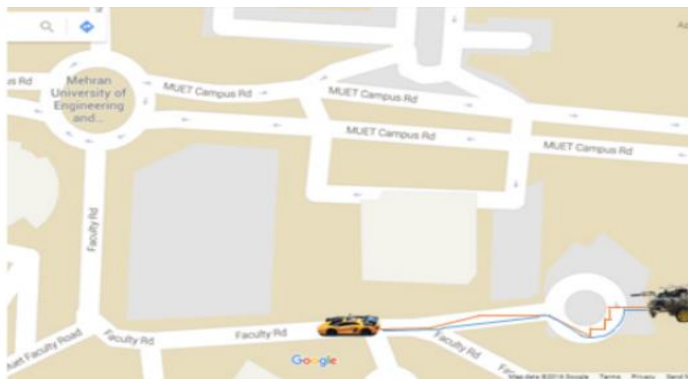
The Following vehicle within the middle of following the Target vehicle can stick with it trying to find the obstacle which may return. To look for the obstacle, ultrasonic sensors are used. Ultrasonic sensors are around the vehicle so that the vehicle find the obstacle and find removed from it. For instance if there's a wall or a pedestrian before of the vehicle, the ultrasonic sensors at the front aspect of the vehicle can detect and the vehicle can communicate the safe aspect, another possible scenario may be available that there are 3 obstacles; in front, at the proper aspect and at the left aspect of the vehicle, the ultrasonic sensors can once more find the obstacles associated the vehicle can then move backward albeit there's an obstacle behind, it'll stop for a flash and so once more appearance for the obstacles from the start so deciding the route on the basis of circumstances. The complete the whole of Following vehicle is shown in Fig.4.



**Fig 4. Flowchart of design robot**

#### IV Results

The project has been tested at Mehran University of Engineering and Technology, Jamshoro and located workings smoothly as shown in Figure five, 6 and 7. The front vehicle is moving on its thanks to some destination, whereas the following vehicle (at back) is obtaining GPS location of the front vehicle and moving towards it by obtaining directions and instructions from Google Maps exploitation Google Maps API. Blue line route shows the route taken by the Front vehicle whereas the Red colored line shows the route taken by the subsequent vehicle after obtaining directions from Google Maps.



**Fig 5: Experimenting Self Driving Mechanism**



**Fig 6: Experimenting During Turns.**

By testing the vehicle in real time, we've got conjointly observed that though the target vehicle takes the incorrect route, the following vehicle can follow the correct

route as a result of it is connected to Google Maps. because it could be a image and vehicle is terribly tiny, therefore it's terribly slow however if the system is implemented in real vehicles then this might facilitate in solving the problem in correct way as mentioned problems in real time.

#### V Conclusion

This is a sophisticated step for autonomous driving vehicles. With the assistance of this formula, vehicles is set to auto-matically navigate to the destination location by continuously receiving the direction from another vehicle moving ahead to the same destination. The robotic vehicle routes itself with the steerage of an-other vehicle moving ahead to constant destination, therefore, deviations in time will occur. The goal of navigation process for a mechanistic vehicle is to maneuver the robot to a familiar destination in Associate in Nursing unknown surroundings. The navigation planning is one amongst the very important aspects of autonomous systems. once the robotic vehicle really starts to maneuver towards the planned route it should it should obstacles from the present location to the destined location, thus the robotic vehicle should avoid the obstacles Associate in Nursing follow an best route to succeed in the destined position. The potential applications of this robotic vehicle are to use these styles of autonomous vehicle on highways or heavy traffic roads. These styles of autonomous vehicles may also be used once a driver travels to the new areas. it's Associate in Nursing improved navigation system for autonomous vehicles.

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